ENVIRONMENTAL WORKING GROUP

The Clean Air Color Line: Why Non-Anglo Californians Will Benefit Most From New State Particulate Standards

Renee Sharp and Bill Walker • June 18, 2002

In California, the whiter or richer your neighborhood , the cleaner the air you breathe.

Residents of predominantly non-Anglo or poorer neighborhoods in California are much more likely to be exposed to harmful levels of airborne soot and dust than residents of more affluent or white neighborhoods, according to state and federal data analyzed by the Environmental Working Group (EWG). Although the proposed new soot and dust standards under consideration by the state Air Resources Board (ARB) would benefit all Californians, poor and non-Anglo residents have most at stake in terms of public health.

EWG obtained the average annual readings from state and federal air monitors[1] in 112 neighborhoods that record levels of microscopic soot and dust (technically known as particulate matter, or PM). We overlaid that with neighborhood-level[2] demographic data from the 2000 U.S. Census, and found that the racial and economic inequities of dirty air in California are sharply defined:

Particulate air pollution in predominantly Latino neighborhoods is 36 percent higher than in predominantly Anglo neighborhoods.

- Annual average particulate levels in neighborhoods with mostly non-Anglo residents are 28 percent higher than in areas with mostly Anglo residents. (Figure 1.) This disparity is even more severe when predominantly Latino neighborhoods are considered separately: Compared to Anglo neighborhoods, PM levels in the predominantly Latino neighborhoods are 36 percent higher. (Figure 2.)

- Annual average particulate levels in neighborhoods with a greater than average share of residents living below the federal poverty line are 17 percent higher than in areas with fewer than average poor residents. (Figure 3.)

These elevated levels of pollution mean higher rates of respiratory and cardiopulmonary disease, hospital admissions and death for non-Anglo Californians:

- According to models developed by ARB scientists, PM-related deaths in predominantly non-Anglo neighborhoods are estimated to be almost twice as high as in predominantly white areas. Hospital admissions for PM-related illnesses in predominantly non-Anglo neighborhoods are estimated to be 46 percent higher.[3] (Table 1.)

- If the new standards proposed by ARB scientists were achieved, people living in predominantly non-Anglo communities would see PM-related deaths decline by an estimated 86 percent and hospital admissions for PM-related illnesses decline by 55 percent. For every million people living in these neighborhoods, residents

Figure 1. PM levels in predominantly non-Anglo neighborhoods are 28 percent higher than in predominantly Anglo areas.

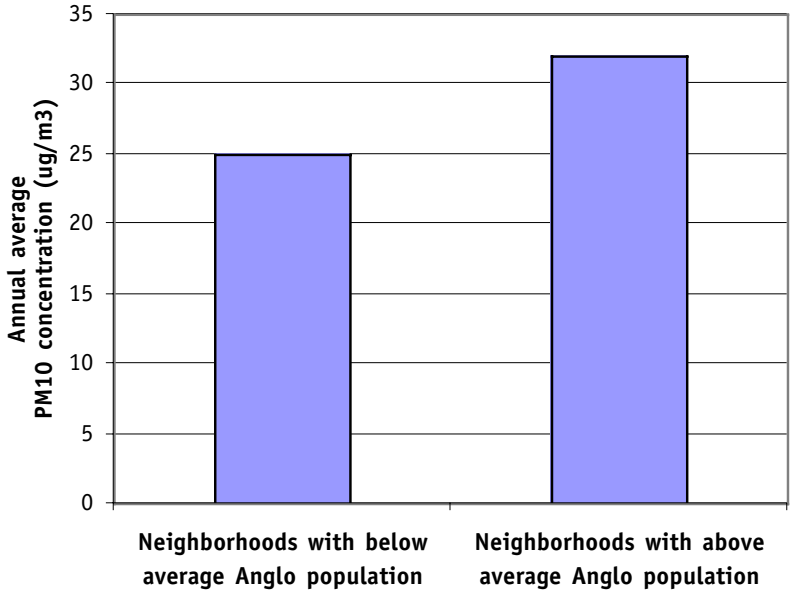


Figure 2. PM levels in predominantly Latino neighborhoods are 36 percent higher than in predominantly Anglo areas.

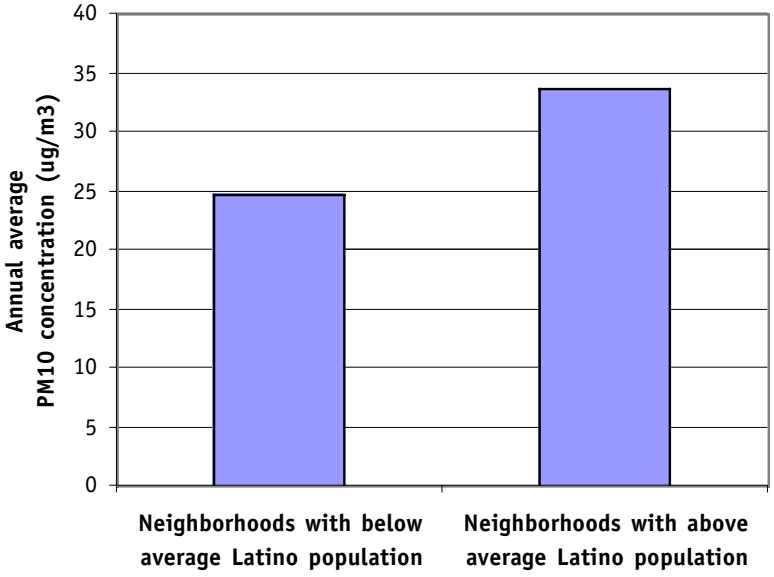
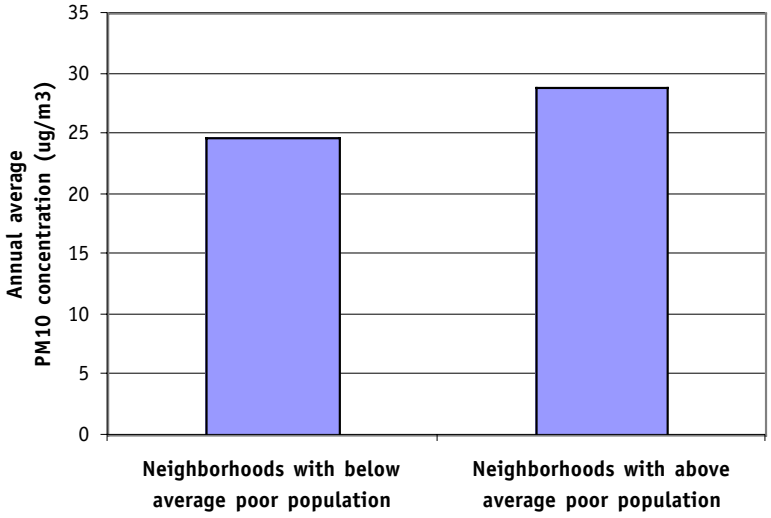


Figure 3. PM levels in neighborhoods with greater than average share of residents living below the U.S. poverty line are 17 percent higher than in areas with fewer than average poor residents.



Source: EWG 2002, based on EPA's AIRS database.

would suffer an estimated 164,000 fewer asthma attacks and lose 86,500 fewer days of work each year from PM-related illnesses.[4] (Table 2.)

Particulate matter is comprised of microscopic solid particles and liquid droplets produced by a variety of natural and man-made sources and suspended in air. Particles less than 10 microns wide (about one-tenth the diameter of a human hair) are called PM10, while particles less than 2.5 microns wide are called PM2.5.[5] Too small to be filtered out by the human respiratory system, they are breathed deeply into the lungs, where they cause or exacerbate a number of illnesses. State scientists estimate that PM causes or contributes to the deaths of more than 9,300 people a year in California – more than the number of deaths caused by car accidents, murder and AIDS combined.[6] (ARB/OEHHA 2001, EWG 2002.)

"Fair Treatment" is the Law

California law requires "the fair treatment of people of all races, cultures and incomes" in developing and enforcing environmental policies.

The state's proposed new particulate rules could be a milestone in the struggle for environmental justice in California. They are the first major air quality regulations developed since the adoption in 1999 of the Environmental Justice Act – SB 115 by former state Sen. Hilda Solis, who now represents the San Gabriel Valley in Congress. The Act requires state agencies to ensure "the fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."

Last year, the ARB adopted its own policy in which it pledged its commitment to "integrating environmental justice into all of its programs, policies and regulations." (ARB 2001a.) The chairman of the ARB, Dr. Alan C. Lloyd, has said that environmental justice policies are "being woven into the very fabric of the ARB's daily activities" and that "we intend to see that these policies are second nature to every effort of the ARB with tangible actions, not just words." (ARB 2001b.)

To remedy the significant disparities in particulate air pollution exposure, however, the proposed new rules must not only be adopted, but rigorously and equitably enforced. ARB's environmental justice policy says increased "air monitoring and research are needed to better understand the connections between air pollution and health," and that "effective enforcement of air pollution control requirements in all communities is critical to achieving environmental justice." (ARB 2001a.)

Lax Enforcement in Non-Anglo Areas

Yet 80 percent of the air quality monitors in California are located in neighborhoods whose Anglo population exceeds the statewide average. (Table 3) And EWG's analysis of federal data found that enforcement of air pollution laws is also stronger in majority Anglo neighborhoods. Nationwide, the average penalty for air pollution violations is more than three times higher in areas with a greater than average Anglo population, compared to areas with a greater than average non-Anglo population. (Figure 4.)

Table 1. Hospital admissions for PM-related illnesses in predominantly non-Anglo neighborhoods are estimated to be 46 percent higher than in predominantly Anglo neighborhoods.

		Cases (per million residents) due to PM pollution*		
	Ages considered	Neighborhoods with above-average Anglo population**	Neighborhoods with above-average non-Anglo population	Percent higher in neighborhoods with predominantly non-Anglo population
Deaths from long-term exposure	30+	218	432	98.2%
Cases of chronic bronchitis	27+	493	701	42.2%
Hospital admissions from chronic obstructive pulmonary disease	65+	400	580	45.0%
Hospital admissions from pnemonia	65+	576	838	45.5%
Hospital admissions from cardiovascular disease	65+	1,020	1,490	46.1%
Hospital admissions for asthma	64-	35	51	45.7%
Emergency room visits for asthma	64-	88	127	44.3%
Asthma attacks	All	205,018	299,267	46.0%
Work loss days from PM10-related illnesses	18 to 64	125,589	158,242	26.0%

*Neighborhoods with a below average number of Anglos have an annual average PM10 level of 32.0 ug/m3 while those with an above average number of Anglos have an annual average of 25.0 ug/m3. The proposed PM10 annual standard is 20 ug/m3.
**On average, non-Anglos comprise 53.3 percent of the population in California. (US Census 2000)

Source: EWG analysis based on ARB/OEHHA (2001) models.

Table 2. For every one million residents of predominantly non-Anglo neighborhoods, achieving the state's proposed PM standards would mean 164,000 fewer asthma attacks and 86,500 fewer lost work days each year .

	Fewer cases per million residents if proposed PM standards were met*		Percent fewer cases if proposed PM standards were met	
	Neighborhoods with above-average Anglo population**	Neighborhoods with above-average non-Anglo population	Neighborhoods with above-average Anglo population	Neighborhoods with above-average non-Anglo population
Deaths from long-term exposure	156	371	72%	86%
Cases of chronic bronchitis	172	400	35%	57%
Hospital admissions from chronic obstructive pulmonary disease	135	231	34%	55%
Hospital admissions from pnemonia	194	462	34%	55%
Hospital admissions from cardiovascular disease	342	818	34%	55%
Hospital admissions for asthma	12	28	34%	55%
Emergency room visits for asthma	30	70	34%	56%
Asthma attacks	68,806	164,349	34%	55%
Work loss days from PM10-related illnesses	36,626	86,507	29%	55%

*Neighborhoods with a below average number of Anglos have an annual average PM10 level of 32.0 ug/m3 while those with an above average number of Anglos have an annual average of 25.0 ug/m3. The proposed PM10 annual standard is 20 ug/m3.
**On average, non-Anglos comprise 53.3 percent of the population in California. (US Census 2000)

Source: EWG analysis based on ARB/OEHHA (2001) models.

According to EWG analysis of air monitoring data, the annual average PM10 level in neighborhoods with a non-Anglo population above the state average is 32.0 micrograms per cubic meter of air ($\mu g/m^3$). (Chart A) This is 28 percent higher than the annual average in neighborhoods with below average non-Anglo populations, and 60 percent higher than the proposed annual standard of 20 $\mu g/m^3$ being considered by the ARB.

The disparity is particularly apparent when you compare the 10 monitored neighborhoods with the lowest number of Anglos (average 78 percent non-Anglo) with the 10 neighborhoods with the highest Anglo populations (average 94 percent Anglo). The average PM10 level in the whitest neighborhoods is 61 percent lower than the average particulate level in the neighborhoods with the lowest number of Anglo residents (21.6 $\mu g/m^3$ vs. 34.8 $\mu g/m^3$).

Statewide, neighborhoods with above average numbers of Latino residents have an average PM10 level of 33.7 $\mu g/m^3$. That is 36 percent higher than neighborhoods with below average numbers of Latino residents (where average PM10 levels are 24.7 $\mu g/m^3$), and 69 percent higher than the proposed annual PM10 standard. (Figure 2.) Moreover, the average particulate level in the 10 neighborhoods with the highest number of Latinos is 70 percent higher than the 10 neighborhoods with the fewest Latinos (36.4 $\mu g/m^3$ vs. 21.4 $\mu g/m^3$).

Economic Disparity

Poorer neighborhoods have higher PM levels than better-off neighborhoods, but the economic disparity is less severe than the racial disparity.

EWG found that poorer neighborhoods typically have higher particulate pollution levels than better-off neighborhoods, but that this income-related disparity is less pronounced that the racial disparity. For example, California neighborhoods with above average percentages of residents living below the federal poverty line have annual PM10 levels that average 28.9 $\mu g/m^3$, while richer areas have an annual average of 24.7 $\mu g/m^3$ –about 17 percent lower. And the 10 poorest neighborhoods had average particulate levels that are 21 percent higher than the 10 richest (25.2 $\mu g/m^3$ vs. 29.2 $\mu g/m^3$). These finding is consistent with previous research comparing economic with racial disparities (eg. Gelobter 1988 and 1990, Wernette and Nieves 1992).

Despite real progress in cleaning California's air over the last two decades, racial and economic inequities in air pollution exposure have persisted. In the 1970s, after researchers first documented race and income-based differences in exposure to air pollution, they predicted this pattern would disappear after the passage of the federal Clean Air Act because the standards were required to be applied uniformly. (Bullard and Wright 1993.)

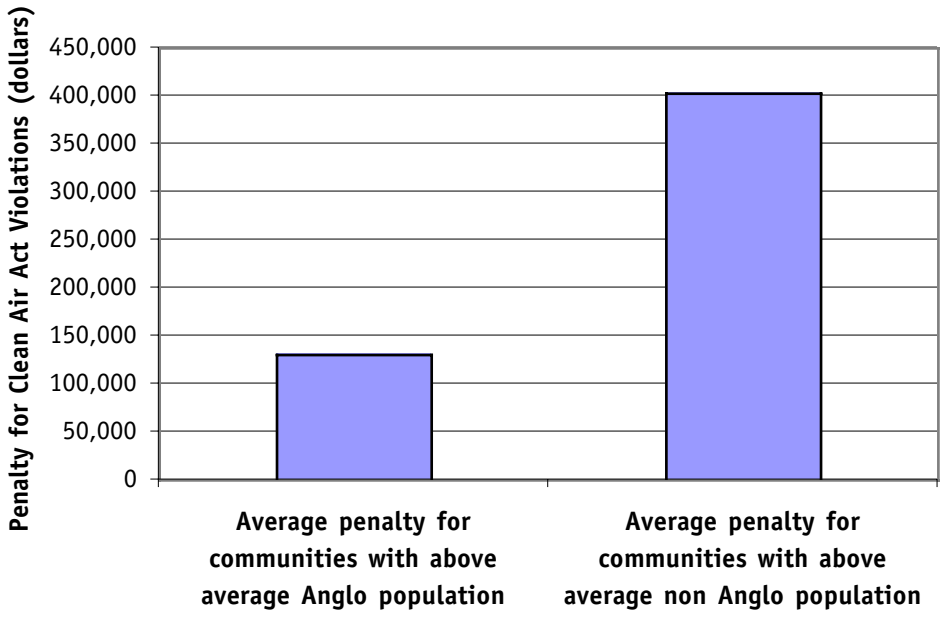
However, when researchers revisited the issue in the late 1980s and early 1990s, they found that significant inequities remained. (Gelobter 1988 and 1990, Wernette and Nieves 1992.) A 1992 study, for example, compared the racial makeup of areas that failed to meet federal ambient air quality standards and found that nationwide, 33 percent of Anglos, 50 percent of African-Americans, and 60 percent of Hispanics live in the 136 U.S. counties in which two or more air pollutants exceed standards. (Wernette and Nieves 1992.)

Table 3. Eighty percent of the air quality monitors in California are in areas that have an above average Anglo population.

Percent of residents who are Anglo	Number of monitors in neighborhoods	Percent of monitors in neighborhoods
90-100%	14	12.5%
80-90.0%	32	28.6%
70-80.0%	23	20.5%
60-70.0%	10	8.9%
50-60.0%	6	5.4%
40–50.1%	7	6.3%
30-40.0%	9	8.0%
20-30.0%	5	4.5%
10-20.0%	1	0.9%
0-10.0%	2	1.8%

Source: EWG analysis of 112 state and federal air monitoring locations from EPA's AIRS database. Multiple monitors at the same location were counted as one location. Only those monitors with demographic data available were analyzed.

Figure 4. Nationwide, the average penalty for air pollution violations is more than three times higher in areas with a greater than average Anglo population, compared to areas with a greater than average non-Anglo population.



Source: EWG 2002, based on EPA's SFIP database.

Last year, University of California researchers published the results of a study of the 100 largest emitters of toxic air pollutants in Los Angeles County. They found that two-thirds of the neighborhoods where these facilities were sited had a greater percentage of non-Anglo residents than the county-wide average. Latinos were the most likely ethnic group to live in neighborhoods adjacent to the plants, even when adjusting for income levels. (Carlson and Zasloff 2001.)

In Los Angeles, two-thirds of the worst air polluters are in neighborhoods with higher than average non-Anglo populations.

Particulates and Public Health

PM pollution has been linked to an array of respiratory ailments in children and adults. Studies have shown that for every 10 micrograms of PM10 added to every cubic meter of air, symptoms of respiratory illnesses increase, with some studies showing increases of up to 40 percent. (ARB/OEHHA 2001.) A major international research effort examining the short and long-term effects of PM exposure has clearly established that increased particulates are associated with increased mortality. (EWG 2002.) (The software glitch recently discovered to have affected one study's estimates of short-term mortality related to PM-exposure has not in any way called into question the validity of the relationship, but rather the magnitude of the effects seen in studies which used similar study design and software. The estimates of long-term mortality (the only type used in this report) remain unaffected because these studies employed an entirely different method of analysis.)

Although it is no secret that poor and non-Anglo residents of California are exposed to higher levels or air pollution than more affluent and Anglo residents, the health effects of this disparity are not as well recognized. Yet it is clear that many more poor and non-Anglo Californians die of illnesses caused or exacerbated by particulate pollution than whites and those of higher income levels.

EWG calculated the number of deaths and hospital admissions related to PM exposures and found that statewide, people living in neighborhoods with a greater than average non-Anglo population were almost twice as likely to die, and 46 percent more likely to be hospitalized from PM-related illnesses or suffer from PM-induced asthma attacks. (Table B) Each year, for every million people living in areas with higher than average non-Anglo populations, particulate matter causes or contributes to more than 430 deaths, 3,000 hospital visits and almost 300,000 asthma attacks. (Table B.)

If the new proposed particulate standards were met, PM-related deaths in above-average Anglo neighborhoods would decline by 72 percent a year, but by 86 percent in above-average non-Anglo neighborhoods. (Table A) Predominantly non-Anglo neighborhoods would also see PM-related cases of chronic bronchitis and hospitalizations for chronic obstructive pulmonary disease, pneumonia, cardiovascular disease and asthma decline by 56 percent. Asthma attacks and work-loss days related to PM would decline by 55 percent.

Similar declines in PM-related deaths would also occur in neighborhoods with above average numbers of Latinos (an estimated 88 percent reduction) and residents living in poverty (82 percent). Hospitalizations for illnesses related to particulate matter, PM-induced asthma

attacks and work-loss days in these neighborhoods would fall by an estimated 59 percent in Latino neighborhoods and and 48 percent in poor neighborhoods.

ARB acknowledges that the key to eliminating or reducing racial or economic disparities in PM exposures is better enforcement of air regulations. This, however, presents two problems. First, the state PM standards are not binding. Second, our analysis of a federal air regulation database showed that there are race-based disparities in enforcement. (State-level data were unavailable.)

Non-binding air pollution standards may "define clean air," but they do nothing to achieve it.

Unlike federal standards which are legally binding, "air districts with areas designated nonattainment for the State PM10 standards are not required by State law to develop plans for attaining the State PM10 standards." (ARB/OEHHA 2001.) Although regional air quality management districts and the ARB are mandated to take steps toward achieving the state standards by adopting "rules and regulations", there are no penalties for non-compliance. Rather, "standards simply define clean air." (ARB/OEHHA 2001.) The consequences of these toothless particulate standards are clear: Twenty years after the State approved its first PM10 standards in 1982, only one county is in attainment with these standards.[7] (ARB 2000.) Millions of Californians in Greater Los Angeles and the San Joaquin Valley breathe the dirtiest and most dangerous air in the country.

Penalties Applied Unevenly

Successfully meeting air quality standards and achieving environmental justice depends first on the adoption of rules and regulations to control emissions, and the "the fair and firm use of appropriate and meaningful penalties to address violations of local, state, or federal air quality rules, regulations or laws." (ARB 2001c.) But the ARB's own review of enforcement of air quality regulations at petroleum refineries found that:

> "Within each district, there were significant ranges of penalties assessed for violations of the same district rules or regulations, with some violations being assessed a higher penalty than other violations of the same rule. There were also significant differences in the amounts of penalties collected for violations of similar rules from district to district." (ARB 2001c.)

What's more, there is evidence that there may be race-based disparities in the enforcement of air quality regulations. EWG analyzed data from the Environmental Protection Agency's Sector Facility Indexing Project (SFIP) database[8] which contains information on compliance with three major federal environmental laws: the Clean Air Act, Clean Water Act, and the Resource Conservation and Recovery Act, which regulates the disposal of solid and hazardous wastes. The database includes records for about 900 petroleum refining, iron and steel production, metal refining and smelting, pulp manufacturing, automobile assembly and other facilities.[9] SFIP also includes information on the demographic makeup of the communities surrounding each facility.

EWG analyzed the penalties assessed for Clean Air Act violations and found that higher penalties were assessed in predominantly Anglo neighborhoods than in predominantly

non-Anglo neighborhoods. For example, the average penalty assessed in communities with an above-average Anglo population was more than three times higher than the average penalty assessed in areas with a below-average Anglo population: $403,000 vs. $131,100. (Figure 4.) Nine of the 10 highest penalties were assessed in areas that had a higher percentage of whites than the national average of 70 percent. Without more rigorous and equitable enforcement at both the state and federal levels, both clean air and environmental justice will remain unattainable.

Recommendations

More air monitors must be placed in areas with predominantly non-Anglo populations.

- The ARB should resist pressure from polluting industries and adopt the proposed new PM standards.

- The ARB must strictly enforce these standards, targeting poor and non-Anglo neighborhoods for increased attention, to erase the significant racial and income-based disparities in air pollution.

- More air monitors must be placed in areas with high non-Anglo populations. The distribution of monitors should at a minimum reflect the racial and economic diversity of the state. Special monitoring studies, such as the ARB is now conducting in six predominantly non-Anglo neighborhoods throughout the state, should continue.

Footnotes

[1] Data analyzed were from EPA's AIRS database which includes state and federal air monitors as well as a few local monitors. Values for multiple monitors in the same location were averaged. Data from three locations were excluded because of inconsistencies between the monitors. Monitoring data was used only where demographic information was also available for those locations and where at least three years of air quality data were available.

[2] Demographic data was used for the census tracts where air quality monitors are located. Monitors that could not be associated with a census tract or where demographic information was unavailable were excluded from the analysis.

[3] The recently discovered software glitch affecting the National Morbidity and Mortality and Air Pollution Study (NMMAPS) estimates of PM-related daily mortality does not affect these values, as they are comparisons based on differences in exposure.

[4] The mortality figures in this report are not affected by the NMMAPS software glitch because they are based on long-term exposure data which employed a very different method of analysis than time-series studies such as NMMAPS. The figures on illness rates, hospital admissions and asthma attacks were based on ARB/OEHHA models which were constructed using information from many different studies, some of which used methodology and software similar to the NMMAPS study. At the time of publication of this report state scientists were unable to determine how (if at all) the software glitch might affect their models. It is possible, therefore, that the non-mortality figures on PM-related health impacts may be overestimates of the actual number.

[5] This figure is not affected by the NMMAPS software glitch. See above footnote for more detail.

[6] Estimates of PM-related health effects in this analysis are for PM10 exposure. There are currently too few monitors measuring PM2.5 levels for a similar analysis to be conducted for PM2.5.

[7] Three additional counties in Northern California have not been classified as being in or out of attainment with the PM standards because of a lack of data.

[8] Available at http://www.epa.gov/sfipmtn1/index.html

[9] 96 of these facilities were excluded from the analysis because they did not have demographic information available. Not enough California-specific data was available to do a race-based analysis.

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